Amendment to the Claims

Please cancel claims 38-53 without prejudice to pursuing these claims in a continuation, divisional, continuation-in-part, or other application. Please withdraw claims 18-37.

1-9. (Cancelled)

10. (Original) A method for packaging a microelectronic substrate, comprising:

providing a microelectronic substrate having a first surface, a second surface facing opposite from the first surface, and a plurality of first connection sites at least proximate to the first surface;

disposing flowable, electrically conductive couplers at the first connection sites;

disposing a generally non-conductive material between the conductive couplers;

selecting a gap dimension based on a target underfill material flow rate;

removing at least a portion of the generally non-conductive material to form a gap between neighboring conductive couplers, the gap having the selected gap dimension in a direction generally normal to the first surface of the microelectronic substrate;

connecting the microelectronic substrate to a support member by attaching the conductive couplers to second bond sites of the support member; and

flowing an underfill material into the gap at at least approximately the target underfill material flow rate.

11. (Original) The method of claim 10 wherein selecting the gap dimension includes selecting the gap dimension to be at least 25 microns.

12. (Original) The method of claim 10 wherein the underfill material includes a plurality of particles having a mean diameter, and wherein selecting the gap dimension includes selecting the gap dimension to be at least three times the mean diameter of the particles.

13. (Original) The method of claim 10 wherein the microelectronic substrate has a plurality of edges, and wherein the method further comprises disposing the underfill material along at least one of the edges, further wherein flowing an underfill material into the gap at at least approximately the target underfill material flow rate includes filling the gap before the underfill material wicks completely around the edges of the microelectronic substrate.

14. (Original) The method of claim 10, further comprising selecting the conductive couplers to include solder balls.

15. (Original) The method of claim 10, further comprising selecting the conductive couplers to include a flux material and a plurality of solder particles disposed in the flux material.

16. (Original) The method of claim 10, further comprising removing material from the second surface of the microelectronic substrate to thin the microelectronic substrate before removing at least a portion of the generally non-conductive material.

17. (Original) The method of claim 10 wherein removing at least a portion of the generally non-conductive material includes etching at least some of the generally non-conductive material.

18. (Withdrawn) A method for processing microelectronic substrates, comprising:

providing a first microelectronic substrate having a first surface, a second surface facing opposite from the first surface, and a plurality of first connection sites positioned at least proximate to the first surface, each first connection site carrying a first flowable, electrically conductive coupler, each first conductive coupler having a first outer surface spaced apart from the first surface of the first microelectronic substrate by a first distance, the first outer surfaces defining a first plane;

applying a first generally non-conductive material to the first conductive couplers and the first surface of the first microelectronic substrate;

selecting a first recess distance;

removing at least some of the first generally non-conductive material from between the first conductive couplers to recess the first generally non-conductive material from the first plane by the first recess distance;

providing a second microelectronic substrate having a first surface, a second surface facing opposite from the first surface, and a plurality of second connection sites positioned at least proximate to the first surface of the second microelectronic substrate, each second connection site having a second flowable, electrically conductive coupler, each second conductive coupler having a second outer surface spaced apart from the first surface of the second microelectronic substrate by a second distance different than the first distance, the second outer surfaces defining a second plane;

applying a second generally non-conductive material to the second conductive couplers and the first surface of the second microelectronic substrate;

selecting a second recess distance to be at least approximately the same as the first recess distance; and

removing at least some of the second generally non-conductive material from between the second conductive couplers to recess the second generally non-conductive material from the second plane by the second recess distance.

19. (Withdrawn) The method of claim 18, further comprising:

removing material from the second surface of the first microelectronic substrate to thin the first microelectronic substrate prior to removing at least some of the first generally non-conductive material; and

removing material from the second surface of the second microelectronic substrate to thin the second microelectronic substrate prior to removing at least some of the second generally non-conductive material.

20. (Withdrawn) The method of claim 18, further comprising selecting the first and second generally non-conductive materials to have at least approximately the same composition.

21. (Withdrawn) The method of claim 18, further comprising selecting the first and second conductive couplers to include solder balls.

22. (Withdrawn) The method of claim 18, further comprising selecting the first and second recess distances to be about 25 microns or more.

23. (Withdrawn) The method of claim 18, further comprising flowing an underfill material between the first microelectronic substrate and a first support member attached to the first conductive couplers, wherein the underfill material includes a plurality of particles, the particles having a mean diameter, and wherein selecting the first and second recess distances includes selecting the first and second recess distances to be about three times the mean diameter of the particles.

24. (Withdrawn) A method for forming a microelectronic package, comprising:

positioning a microelectronic substrate proximate to a support member, the microelectronic substrate having a first surface, a second surface facing opposite from the first surface, and a plurality of first connection sites at least proximate to the first surface, the support member having a plurality of second connection sites;

connecting the microelectronic substrate to a support member by attaching conductive couplers between the first connection sites of the microelectronic substrate and the second connection sites of the support member; and

disposing at least one generally non-conductive material adjacent to the conductive couplers, the at least one generally non-conductive material being spaced apart from the support member.

25. (Withdrawn) The method of claim 24 wherein the at least one generally non-conductive material is a first generally non-conductive material, and wherein the method further comprises disposing a second generally non-conductive material adjacent to the support member and the conductive couplers, the second generally non-conductive material being spaced apart from the first generally non-conductive material.

26. (Withdrawn) The method of claim 24, further comprising separating the microelectronic substrate from the support member without damaging either the microelectronic substrate or the support member.

27. (Withdrawn) The method of claim 24, further comprising separating the microelectronic substrate from the support member by elevating a temperature of the conductive couplers.

28. (Withdrawn) The method of claim 24 wherein the microelectronic substrate is a first microelectronic substrate and wherein the method further comprises removing the first microelectronic substrate from the support member and attaching a second microelectronic substrate to the support member in place of the first microelectronic substrate.

29. (Withdrawn) The method of claim 24 wherein attaching conductive couplers between the first and second connection sites includes disposing on the second connection sites a flux material, and elevating a temperature of the flux material.

30. (Withdrawn) The method of claim 24 wherein disposing a first generally non-conductive material adjacent to the conductive couplers includes disposing on the second connection sites a flux material having an epoxy component, and wherein the method further includes curing the epoxy.

31. (Withdrawn) A method for forming a microelectronic package, comprising:

providing a microelectronic substrate having a first surface, a second surface facing opposite from the first surface, and a plurality of first connection sites positioned at least proximate to the first surface, with each first connection site carrying a flowable conductive coupler, the conductive couplers having an outer surface defining an outer surface plane spaced apart from the first surface, the microelectronic substrate further having a first generally non-conductive material disposed between the conductive couplers, the first generally non-conductive material being recessed from the outer surface plane to define a flow channel between the volumes of flowable conductive material, the flow channel having an inner region and an outer region disposed outwardly from the inner region;

disposing a second generally non-conductive material on a support member, the support member having a plurality of second bond sites, the second generally non-conductive material forming a layer over the second bond sites, the layer having a first region and a second region disposed outwardly from the first region, the first region having a greater thickness than the second region;

engaging the inner region of the flow channel with the first region of the second generally non-conductive material while the second generally non-conductive material is at least partially flowable; and

moving at least one of the microelectronic substrate and the support member toward the other while forcing gas within the flow channel generally outwardly through the flow channel to the outer region of the flow channel.

32. (Withdrawn) The method of claim 31 wherein disposing the first generally non-conductive material includes disposing an epoxy material.

33. (Withdrawn) The method of claim 31 wherein disposing the second generally non-conductive material includes disposing an underfill material.

34. (Withdrawn) The method of claim 31 wherein disposing the second generally non-conductive material includes disposing the second generally non-conductive material to have an at least approximately dome shaped volume.

35. (Withdrawn) The method of claim 31, further comprising forcing at least approximately all the gas outwardly out of the flow channel.

36. (Withdrawn) The method of claim 31 wherein the flow channel is one of a plurality of flow channels, each having an inner region and an outer region disposed outwardly from the inner region, and wherein the method further comprises forcing gas within the flow channels generally outwardly through the flow channels to the outer regions of the flow channels.

37. (Withdrawn) The method of claim 31, further comprising filling the flow channel with the second generally non-conductive material.

38-53. (Cancelled)